leaves and branches; after this cool air has settled quietly to the ground it cools still further by its own radiation and by contact with the cooling grass and leaves until fog is formed; the particles of fog then cool by their own radiation and thus the layer of cold air grows upward and the fog grows higher and higher until a little after sunrise.

Observers who look down upon such marshes and valleys from elevated stations would do well to keep a record of the depth of the accumulated layer of fog by noting the points that are still uncovered at its upper edge.

THE "GRAN CULTURA" IN PUERTO RICO.

As the term "Gran Cultura" has no single English equivalent and must, therefore, be bodily transferred from Puerto Rican usage into local English, we take pleasure in publishing the following letter explaining the meaning of the term:

LUQUILLO, PUERTO RICO, *Dec.* 11, 1899.

Dr. GEDDINGS,
Weather Bureau, San Juan.

DEAR SIR: In reply to your question as to the generally accepted translation of the expression "Gran Cultura," I can only tell you we never have used anything here except the two words themselves. There are two or three ways of applying them, but they all work out to the same end and mean, literally, the canes planted during the autumn of one year (say 1898) for grinding early in the second season after (or say in 1900). It may have some reference also to the fact that such canes very naturally get much more cultivation than those of shorter growth. However, I can only reiterate, it is as customary for us to speak of "Gran Cultura" when speaking to others than Spanish speaking people, as it is to apply to any general English term, and I have never heard anything else down here. In comparing with other West Indian islands it might not apply, as we do not all grind at the same season.

Yours, very faithfully,

ARTHUR C. HANSARD.

SCIENTIFIC ASSISTANTS.

The following extract from pages 64–67 of the Report of the Secretary of Agriculture for the year ending June 30, 1899, illustrates the difficulty that has been experienced by every bureau and division in this great Department and in none more so than the Weather Bureau. The steps that have been taken by Secretary James Wilson to secure men having the requisite special education must commend themselves to every one, and will, we hope, stimulate the development of the land grant and agricultural colleges, and also tend to bring their best graduates on to Washington for further study and a broader field of usefulness.

The great prosperity of the country at the present time has resulted among other things in a largely increased attendance upon our universities, colleges, and other institutions of learning. When we consider that half the people of the United States are occupied in producing from the soil directly, that about three-fourths of our exports to foreign countries come from the soil, and that the $600,000,000 balance of trade coming to the United States during the last two fiscal years has been, to a great extent, the price of farm products, it is somewhat remarkable that so very little attention is given to the education of half the people of the nation and their preparation for their future life work.

The beautiful valleys of the mountain and Pacific coast States are being injured to a considerable extent by the injudicious use of irrigating waters. The pasture lands of the public domain west of the Missouri River are being rapidly destroyed by injudicious grazing. The wheat-growing area of the country, where crops are grown continuously, are refusing to yield as they did when first brought under cultivation, and from the Dakotas to the Pacific we find systems of fallowing in operation and crops of wheat being taken once in two years, indicating the rapid destruction of the plant food in the soil.

The people cry aloud to this Departmenf for help. We have gone repeatedly, but in vain, to the Civil Service Commission and had them advertise throughout the country for soil physicists in order that we might cooperate with the people regarding the deterioration of their soils. All the older sections of the United States have injured their soils by injudicious management. A knowledge of plants, their life history, the diseases to which they are subject, their relations to the soil, the climate, the food necessary so their best development, is so scarce among us that plant physiologists and pathologists can not be found by advertising for them.

Animal husbandry is very little understood, and in most of the educational institutions of the country sufficient instruction is not given to make it better understood, yet, from this source we make our most profitable sales to foreign countries. The Biological Survey and other divisions have also to train the men to do their work. When the Department requires the assistance of men educated along these lines it is necessary to educate them in its own scientific divisions, under the direction of its own scientists. When it has trained such men until they become expert and stand at the head of their specialties in the United States (and in many cases in the world), then wealthy institutions take them away by offering higher salaries, interfering with the work of the Department along the lines mentioned, which is so necessary to the producers of the United States.

To meet some of these difficulties and avoid in future their frequent recurrence, I have arranged with the Civil Service Commission to make a register of the graduates of the land-grant colleges of the United States (those endowed by Congress to educate the young farmers of the country). From this registration the scientific divisions of the Department select young men who will assist the division scientists in their work, and have opportunities for post-graduate study and for better preparing themselves along the lines of applied science, whereby the producer is helped by the scholar. We pay these young men no more than we pay a laborer, and much of the work they will perform in the divisions could be performed by skilled laborers.

Slight inquiry into education along the lines of agricultural science will show that there is no university in the land where the graduate of an agricultural college who has been studying along the lines indicated can take post-graduate work. The scientific divisions of the Department of Agriculture come nearer furnishing the necessary facilities than can be found elsewhere. If two or three young men come to each of our scientific divisions and study along the lines of the application of science to production in the field, the stable and the farm factory, the Department will in a few years have a force from which it can not only fill vacancies when wealthy institutions take away trained men, but be able to supply the agricultural colleges, experiment stations, and other scientific institutions in the land with men of superior scientific attainments in these branches.

By this new departure the Department is merely arranging to meet the imperative demands of the producers of the country for help to solve the problems that are beyond their education and their means. The Congress of the United States, in providing for the endowment of agricultural colleges and experiment stations, did more for the agriculture of the country than has been done by governmental agency for the people of any nation. Congress could not endow these institutions with teachers trained in the applied sciences relating to the farm, but Congress has built up the Department of Agriculture and encouraged the development of the foremost scientists known in their several specialties. The step we have taken toward bringing the brightest students of the agricultural colleges to prosecute their studies under the supervision of scientists in this Department is one step necessary to complete the educational system.

Something no doubt remains to be done at the other end of the educational line. The education of the young farmer in the district and high schools should be such as to help him toward the agricultural college. The other educational institutions of the country have done their work well, but so abundantly that the college graduate upon leaving college is not sure of employment that will give the salary of a brakeman on the railroad. Only a very few of those who upon leaving college must earn their livelihood through their literary education are sure of incomes equal to that of a locomotive engineer. The great unexplored field for the educator is along agricultural lines. Half of the people of the United States are interested in it. The prosperity of our country as a nation among nations depends upon it.

I hope to have the approval of Congress in this effort to provide for the higher education of the graduates of the agricultural colleges by appropriations sufficiently considerate to justify the very moderate expense that will be entailed.

BAROMETRIC CORRECTIONS AND REDUCTIONS.

On January 1, 1900, the Weather Bureau will adopt several modifications of previous usages, dictated by the needs of the service and looking to the simplification of records. A knowledge of these new rules will be useful to all who use our data, and therefore we reprint the following extracts from Instructions No. 139 of December 2, 1899:

After January 1, 1900, a specific elevation above sea level will be adopted for each station, and for purposes of record